

ELIMINATION OF STRUCTURE-INFESTING TERMITE POPULATIONS USING PRECISION TARGETING AND BAITING TECHNIQUES

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When whole-structure fumigation is not a feasible option due to construction or environmental restrictions, a localized application of insecticides, or spot treatment, into active foraging galleries of termites has been used as an alternative. Because the foraging galleries for drywood termites are relatively small, injection of liquid insecticides into active infestation may kill the entire colony (Scheffrahn et al. 1997). In severe infestations, however, multi colonies of drywood termites may be present within a building. The challenge for drywood termite control using spot treatments, therefore, is the detection of all active colonies within a structure.

Foraging galleries of a subterranean termite colony may extend up to 100 m from a site of active infestation (Su & Scheffrahn 1988). Spot treatments using liquid insecticides only kill a small portion of the colony. Because the nest structures of a subterranean termite colony are interconnected by foraging galleries, bait containing slow-acting insecticides may be applied through sites of active infestation to impact the entire colony population. Both in-ground (Su 1994, Su et al. 1995) and above-ground (Su et al. 1997) baiting methods incorporating the chitin synthesis inhibitor, hexaflumuron, were successfully used to eliminate colonies of subterranean termites, *R. flavipes*, and *C. formosanus*.

Application of baits using above-ground stations is well suited for remedial control of structure infesting populations of subterranean termites. Baits are placed directly over active foraging sites within a structure so that foraging termites can readily feed and transfer baits to nestmates. Recent development in detection technologies such as the acoustic emissions detector (Scheffrahn et al. 1993, 1997) also provides an additional tool for precision targeting in bait application.

Control of the Formosan subterranean termite, *C. formosanus*, in historic Cabildo complex, French Quarter, New Orleans, provides an example of precision targeting and baiting using the acoustic emissions detector and spatial distribution analysis.

Cabildo was built between 1795 and 1799 to house Louisiana's Spanish governing council. Chronic infestation by *C. formosanus* has been recorded for the last 20 years. A survey conducted in the spring of 1996 indicated severe damage in Creole House, which is the northern portion of the Cabildo complex. Stake survey and triple mark-recapture program (Su & Scheffrahn 1986, 1988) conducted in the courtyard adjacent to Creole House revealed a large colony of *C. formosanus* extending from the courtyard to the

second floor of Creole House. Termite activities on the wooden floor of the second floor of Creole House were recorded using an acoustic emissions detector. Spatial distribution analysis using the acoustic emission counts indicated a *C. formosanus* population extending from the second floor office rooms to the outdoor balcony (Fig. 1). In August 1996, baits containing hexaflumuron were

applied to this *C. formosanus* colony using in-ground and above-ground stations. Activity slowly declined between August and October 1996. By December 1996, only a few acoustic emission counts were detectable from the floor of Creole House. Since March 1997, no termites were found in any of the monitoring or baiting stations, and the acoustic emission counts were all below 10 per minutes, possibly background noises. According to the residents, the spring of 1997 was the first in the last 20 years that termites did not swarm from this building.

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Fig. 1. Spatial distribution of termite activity based on acoustic emission records (counts/minute). Second floor, Creole House, Cabildo complex.

